ONTARIO MINISTRY OF ENVIRONMENT
3693600024486

1969

OPERATING SUMMARY

PRESTON

water pollution control plant

TD
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P748
1969
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Division of Plant Operations

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1969

Preston : water pollution control plant.
81793

Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 195
Ontario

The operating efficiency and financial status of the water pollution control facilities operated for you in 1969 are presented in the following pages.

The regional operations engineer's comments and the statistical data will assist you in gauging the plant's level of performance. A new flow chart and up-to-date design data are also provided.

Various divisions and sections within the Commission have co-operated in providing what we trust is an accurate and concise annual operating summary.

D.S. Caverly,
General Manager.

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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RESOURCES COMMISSION

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PRESTON

water pollution control plant

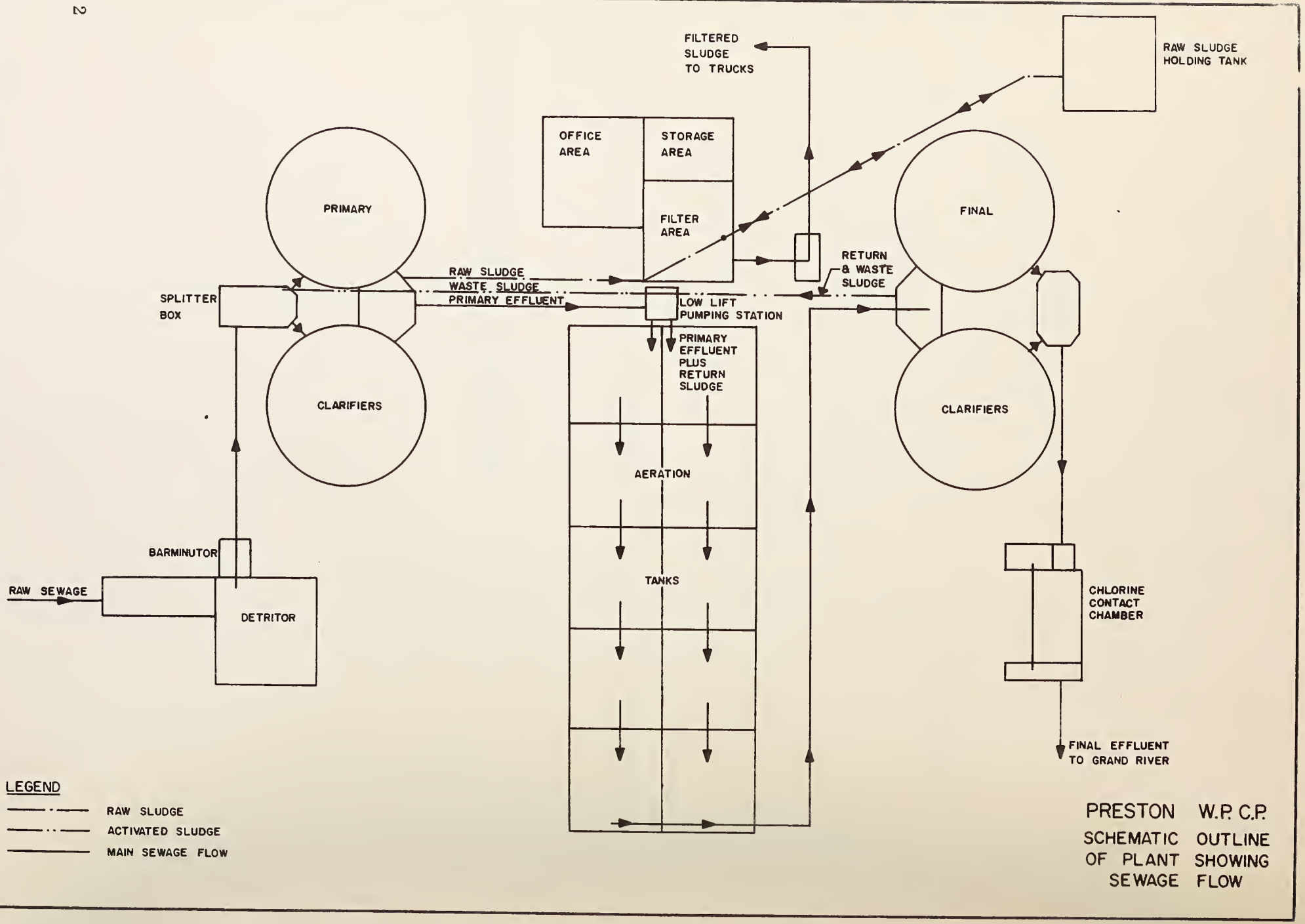
operated for

THE TOWN OF PRESTON

by the

ONTARIO WATER RESOURCES COMMISSION

1969 ANNUAL OPERATING SUMMARY


FILTERED SLUDGE TO TRUCKS
RAW SLUDGE HOLDING TANK
OFFICE AREA
STORAGE AREA
FILTER AREA
PRIMARY
FINAL
RAW SLUDGE
WASTE SLUDGE
PRIMARY EFFLUENT
RETURN & WASTE SLUDGE
SPLITTER BOX
LOW LIFT PUMPING STATION
PRIMARY EFFLUENT PLUS RETURN SLUDGE
CLARIFIERS
CLARIFIERS
AERATION
TANKS
BARMINUTOR
RAW SEWAGE
DETRITOR
CHLORINE CONTACT CHAMBER
FINAL EFFLUENT TO GRAND RIVER
LEGEND
RAW SLUDGE
ACTIVATED SLUDGE
MAIN SEWAGE FLOW
PRESTON W.P.C.P.
SCHEMATIC OUTLINE OF PLANT SHOWING SEWAGE FLOW

DESIGN DATA

PROJECT NO.	2-0046-59	TREATMENT	Activated Sludge
DESIGN FLOW	1.8 mgd	DESIGN POPULATION	15,000
BOD - Raw Sewage	300 mg/l	SS - Raw Sewage	350 mg/l
- Removal	95%	- Removal	90%

PRIMARY TREATMENT

Grit Removal

Type: Dorr detritor
Size: One 20' x 20' x 1½' (3,740 gal)
Retention: 2.1 min

Comminution

Type: Barminutor
Size: Model C (36")

Primary Sedimentation

Type: Dorr
Size: Two 50' dia x 10' swd (246,000 gal)
Retention: 3.3 hr
Loading: Surface, 460 gal/ft^2/day
Weir, 5730 gal/ft/day

Sewage Lift Pumps

Type: Worthington
Size: Two 1800 gpm @ 17.4' tdh

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical; single-pass
Size: Two 150' x 30' x 13' (731,000 gal)
Retention: 9.8 hr

Aerators

- Ten Ames-Crosta

Secondary Sedimentation

Type: Dorr
Size: Two 50' dia x 10' swd (246,000 gal)
Retention: 3.3 hr
Loading: Surface, 460 gal/ft^2/day
Weir, 5730 gal/ft/day

CHLORINATION

Type: F & P
Size: One 400 lb/day

Chlorine Contact Chamber

Size: One 30' x 15' x 6' 8" (18,700 gal)
Retention: 15 min

OUTFALL

- to Grand River

SLUDGE HANDLING

Holding Tank

Size: One 20' x 20' x 11' (4,400 cu ft or 27,400 gal)

Vacuum Filter

Type: Komline-Sanderson
Size: One 250 sq ft

'69 REVIEW

GENERAL

During the year, a total flow of 479 million gallons was treated at a total cost of $62,603.47 or $130.61 a million gallons. The cost for each pound of BOD removed was two cents, and has remained approximately the same since 1965.

The plant staff, under the supervision of head office engineers, operated a clean, attractive and very efficient plant for the Town of Preston during 1969.

PLANTS FLOWS and CHLORINATION

The plant treated an average flow of 1.30 mgd, 72% of the design capacity of 1.8 mgd. This design flow was exceeded 3% of the time, compared with 25% of the time in 1968. The reduction in peak flows during 1969 is due to the new storm sewer (Klotz Drain) installed by the Town of Preston to minimize the infiltration in this area. A maximum daily flow of 2.63 mil. gal., 146% of the design capacity, occurred in January.

The average chlorine dosage of 5.5 milligrams per litre was enough to maintain an average chlorine residual of 0.5 mg/l during 1969.

PLANT EFFICIENCY

The average raw sewage strength was 598 mg/l for BOD and 1,082 mg/l for suspended solids compared with 446 and 746 mg/l in 1968. Although a bylaw prohibiting the discharge of sewage containing more than 350 mg/l of BOD and suspended solids was initiated in 1968, the loadings on the plant

have increased since this period. This average raw sewage BOD content (598 mg/l) was nearly 200% of the design value of 300 mg/l.

The 98% reduction in BOD, compared with 97% in 1968, indicates excellent treatment, especially in light of the very high loading on the plant. The average effluent BOD concentration of 14 mg/l met OWRC objectives, but these were exceeded 35% of the time, 4% less than in 1968.

The suspended solids of 1,082 mg/l were about 300% of the design value of 350 mg/l. As with BOD, there was a 98% reduction in suspended solids, also indicating excellent treatment. The effluent suspended solids concentration averaged 18 mg/l, exceeding the 15 mg/l objective 48% of the time.

SLUDGE DIGESTION and DISPOSAL

The high organic loading on the plant was reflected in the amount of sludge requiring disposal. A total of 5,797 cubic yards of liquid sludge (an increase of 35 cubic yards from 1968) and 5,160 cubic yards of dewatered sludge by vacuum filtration (an increase of 398 cubic yards) were hauled from the plant during 1969.

VACUUM FILTRATION

The vacuum filter was operated for 933 hours in 1969 compared with 976 hours in 1968. The average total raw sludge solids content decreased to 8.6% from 9.4% in 1968. The average filtered solids content was 24%, the same as in 1968. The dosage of lime increased from 8.0% to 9.8%, while ferric chloride dosage increased from 2.2% to 2.8%.

CONCLUSIONS

Considering the very high organic loading and the decrease in hydraulic loading, the plant maintained a very high degree of efficiency during the year. This indicates excellent control of the plant process.

PROJECT COSTS

STAGE 1

NET CAPITAL COST (Final) Long Term Debt to OWRC	$147,617.75
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969	$ 34,397.48
Net Operating	$ -
Debt Retirement	2,979.00
Reserve	601.67
Interest Charged	8,264.36
TOTAL	$ 11,845.03

RESERVE ACCOUNT

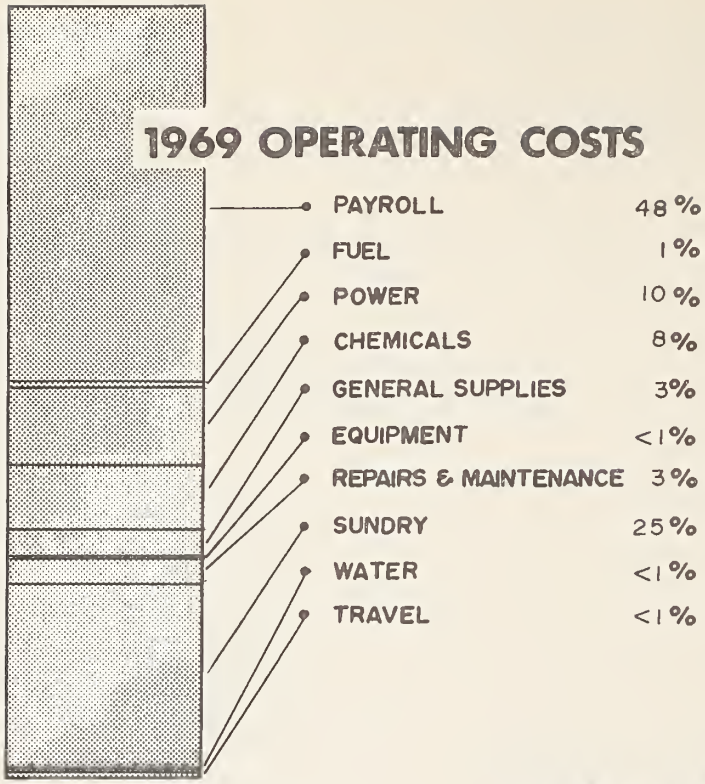
Balance @ January 1, 1969	$ 8,765.50
Deposited by Municipality	601.67
Interest Earned	501.32
	$ 9,868.49
Less Expenditures	228.61
Balance @ December 31, 1969	$ 9,639.88

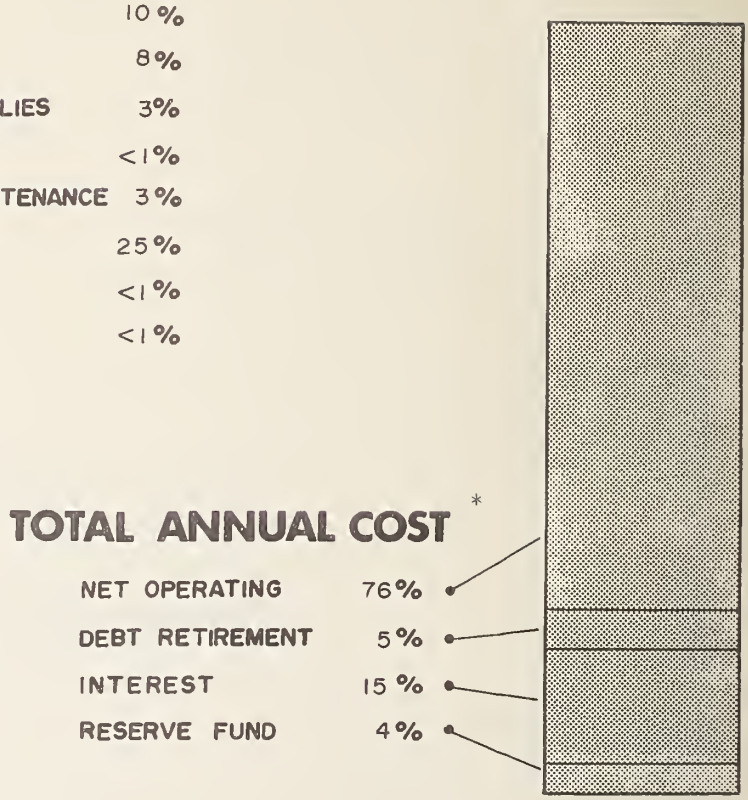
STAGE 2

NET CAPITAL COST (Final)	$647,993.44
DEDUCT - Portion financed by CMHC/MDLB (Final)	432,072.28
Long Term Debt to OWRC	$215,921.16
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969	$ 35,953.65
Net Operating	$ 62,603.47
Debt Retirement	4,357.00
Reserve	3,649.67
Interest Charged	12,088.32
TOTAL	$ 82,698.46

RESERVE ACCOUNT

Balance @ January 1, 1969	$ 20,352.47
Deposited by Municipality	3,649.67
Interest Earned	1,238.25
	$ 25,240.39
Less Expenditures	-
Balance @ December 31, 1969	$ 25,240.39





Yearly Operating Costs

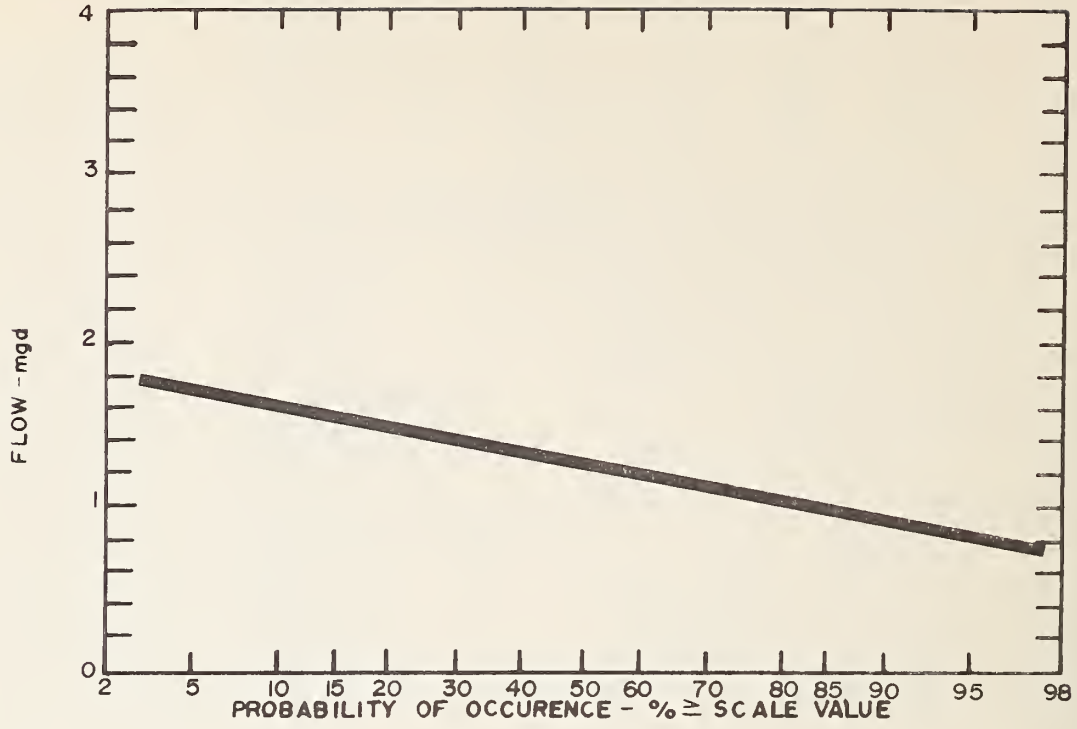
YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1965	326.71	$36,292.57	$111.08	3 cents
1966	336.95	43,359.79	128.68	3 cents
1967	421.18	50,152.64	119.08	3 cents
1968	547.38	61,420.06	112.21	3 cents
1969	479.3	62,603.47	130.61	2 cents

* Stage II only

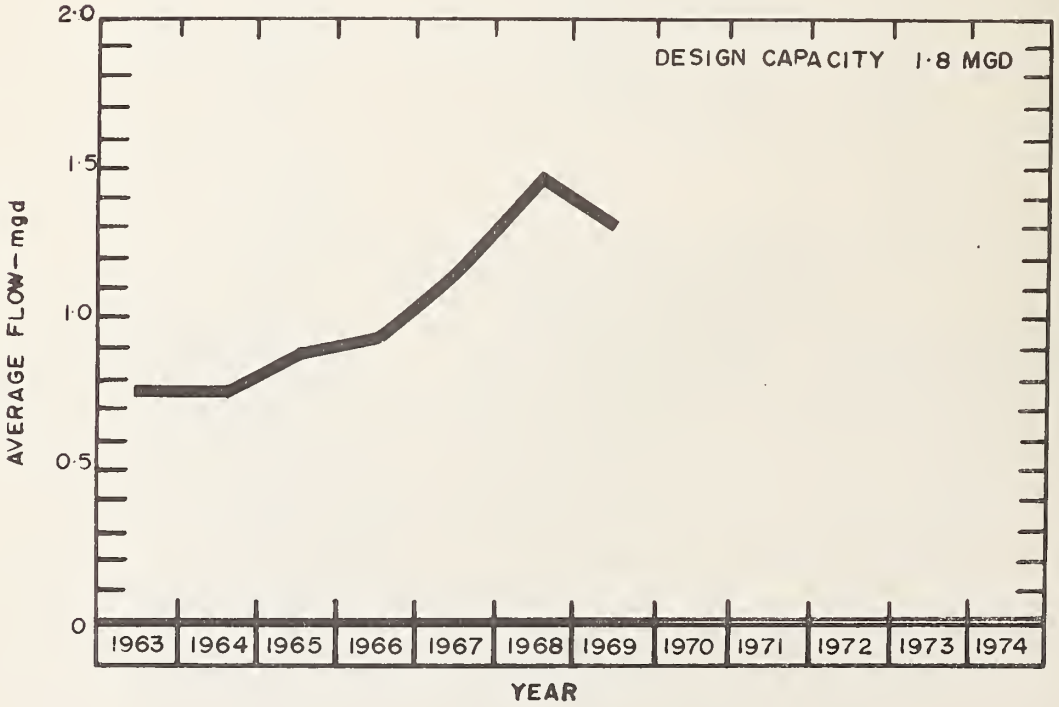
Monthly Operating Costs

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	4668.38	3349.45	-	-	539.65	-	38.39	-	152.00	504.90	60.59	23.40
FEB	4554.49	2229.89	-	102.66	539.65	254.36	68.91	-	105.94	1253.08	-	-
MAR	5562.78	2229.89	-	148.05	523.01	254.36	161.34	215.89	518.70	1425.02	61.92	24.60
APR	4242.19	2400.55	-	-	509.51	-	197.16	29.34	291.30	814.33	-	-
MAY	5485.07	2524.58	-	-	528.83	993.82	192.25	-	284.62	874.58	60.59	25.80
JUNE	4453.05	2260.68	227.06	-	466.41	-	240.40	142.41	-	1111.09	-	5.00
JULY	5090.79	2267.54	311.36	-	479.83	-	109.28	-	-	1759.80	60.14	102.84
AUG	6034.21	3365.95	342.00	-	481.99	606.41	205.91	-	89.55	942.40	-	-
SEPT	5537.11	2264.98	19.26	-	507.26	593.98	147.35	-	-	1907.29	65.04	31.95
OCT	5507.07	2249.78	-	-	440.46	1412.85	218.39	38.43	132.45	1014.71	-	-
NOV	3521.92	2240.15	-	-	489.52	276.05	46.30	-	273.51	44.75	65.04	86.60
DEC	7946.41	2266.40	-	331.45	478.76	552.10	286.11	-	198.22	3669.22	-	164.15
TOTAL	62603.47	29649.84	899.68	582.16	5984.88	4943.93	1911.79	426.07	2046.29	15321.17	373.32	464.34

* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE $12,981.05

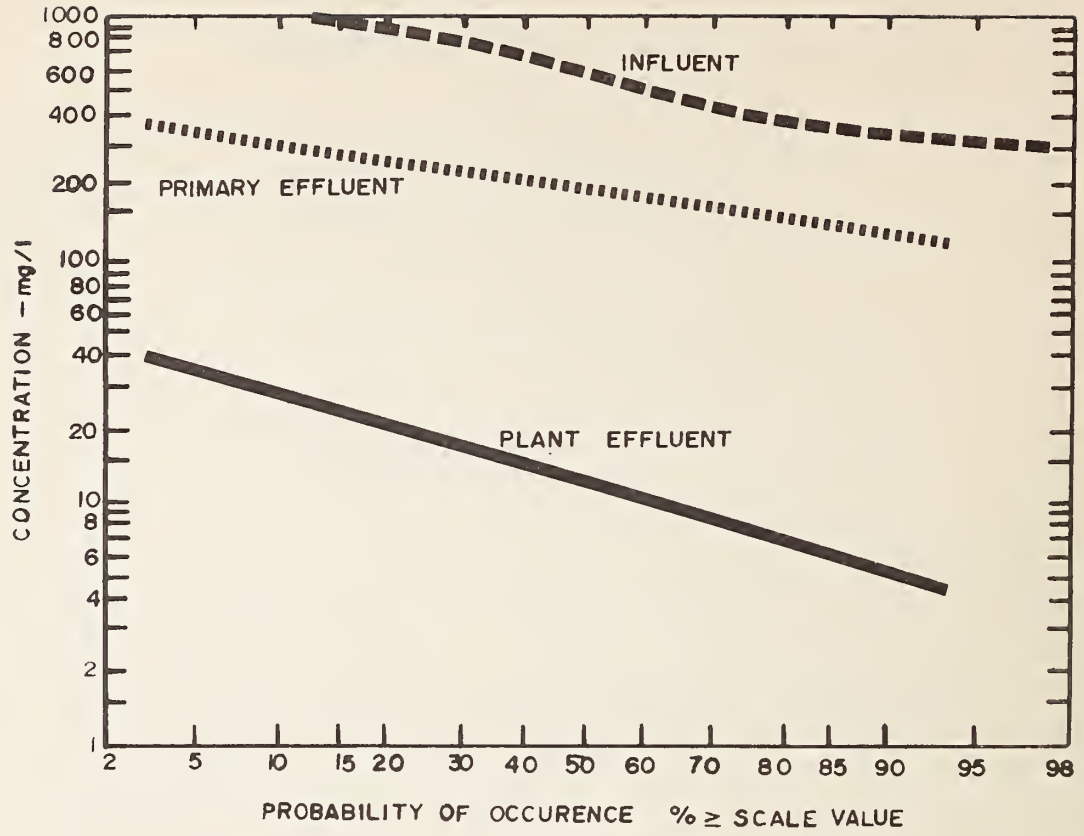

FLOW - mgd
0
1
2
3
4
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
PROBABILITY OF OCCURENCE - % ≥ SCALE VALUE

FLOWS

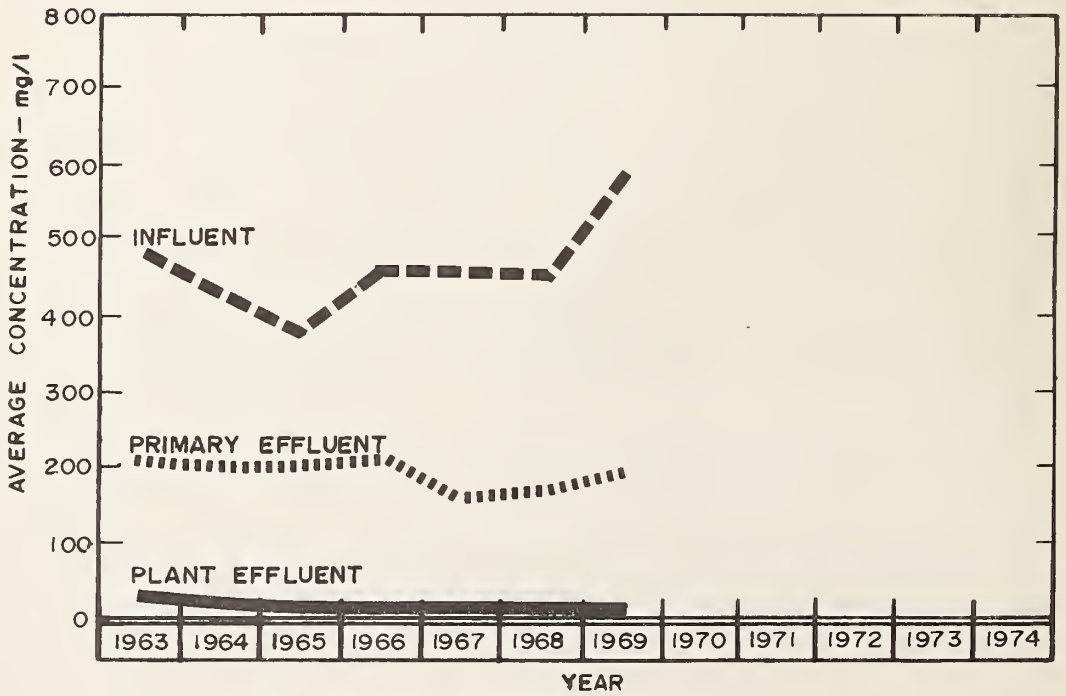

AVERAGE FLOW - mgd
0
0·5
1·0
1·5
2·0
DESIGN CAPACITY 1·8 MGD
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
YEAR

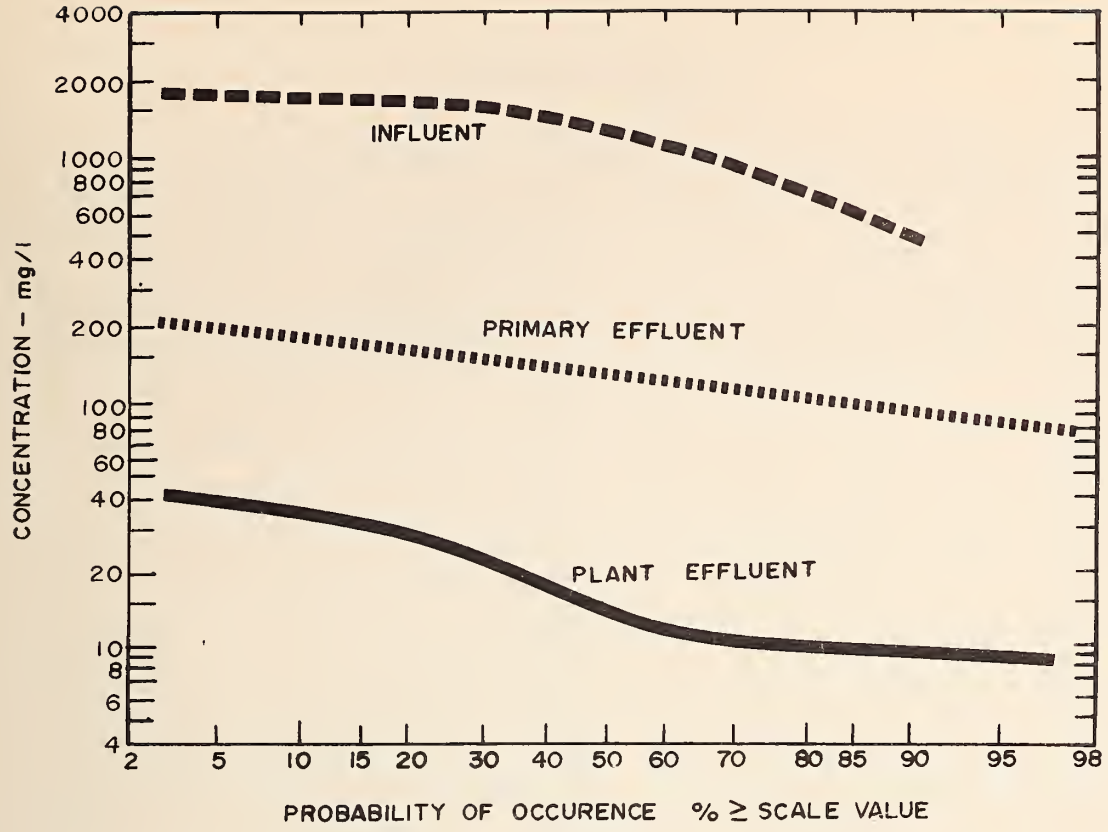
PLANT FLOWS and CHLORINATION

MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED 10^3 pounds	DOSAGE mg/l
JAN	45.4	1.46	2.63	.93	2.17	4.8
FEB	42.6	1.52	1.77	1.14	2.09	4.9
MAR	39.5	1.27	1.72	.72	2.17	5.5
APR	39.6	1.32	2.23	.81	2.01	5.1
MAY	43.1	1.39	1.81	.71	2.20	5.1
JUNE	32.9	1.10	1.49	.65	2.23	6.8
JULY	36.9	1.19	1.43	.79	2.34	6.3
AUG	37.3	1.20	1.48	.77	2.21	5.9
SEPT	36.8	1.23	1.53	.82	2.12	5.8
OCT	43.8	1.41	1.63	.93	2.16	4.9
NOV	41.7	1.39	1.95	.89	2.27	5.4
DEC	39.7	1.28	1.57	.78	2.43	6.1
TOTAL	479.3	-	-	-	26.40	-
AVERAGE	-	1.30	-	-	2.20	5.5

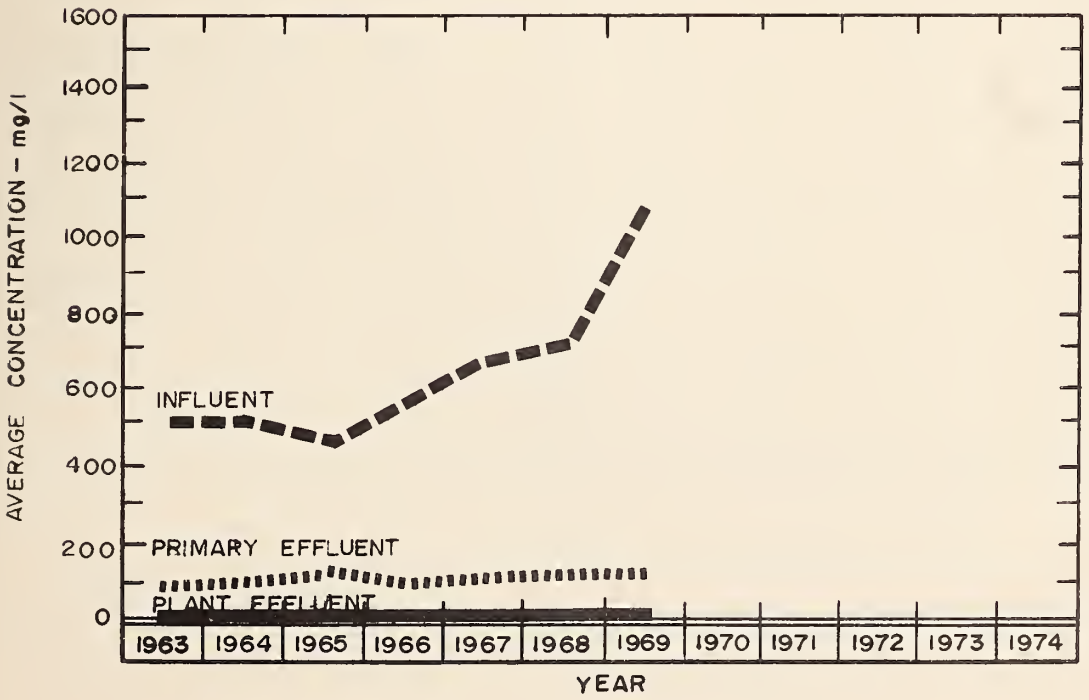


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS

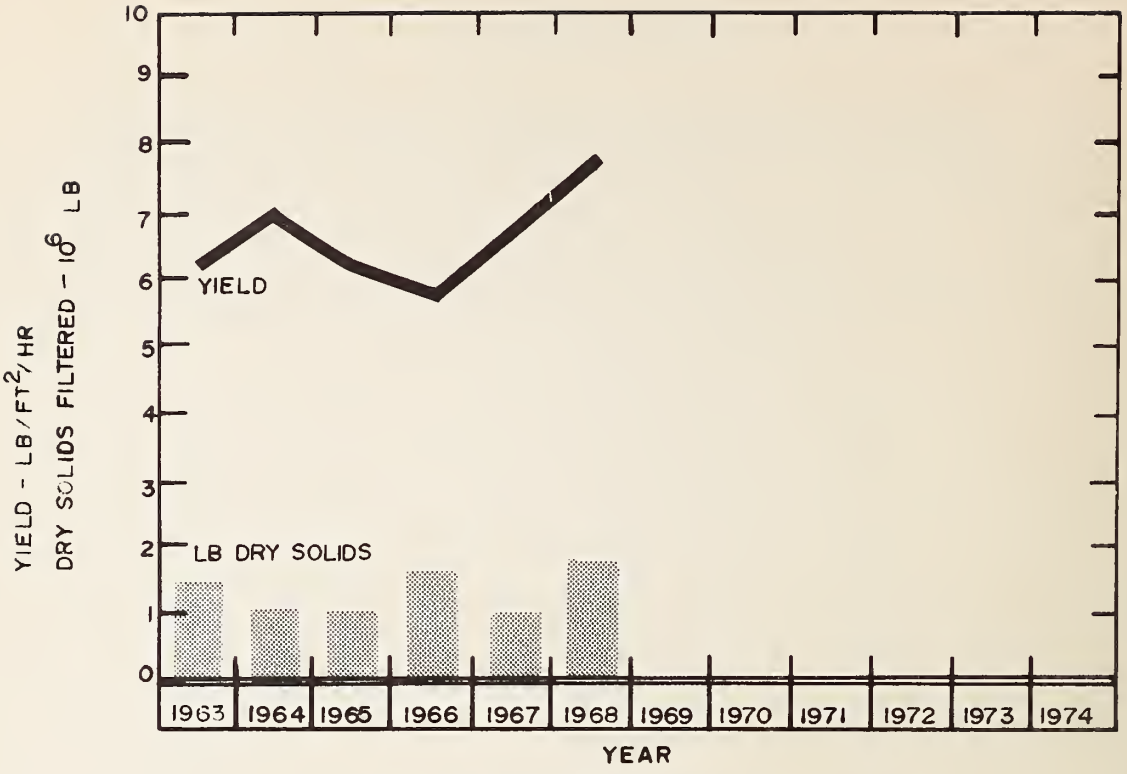


PLANT EFFICIENCY

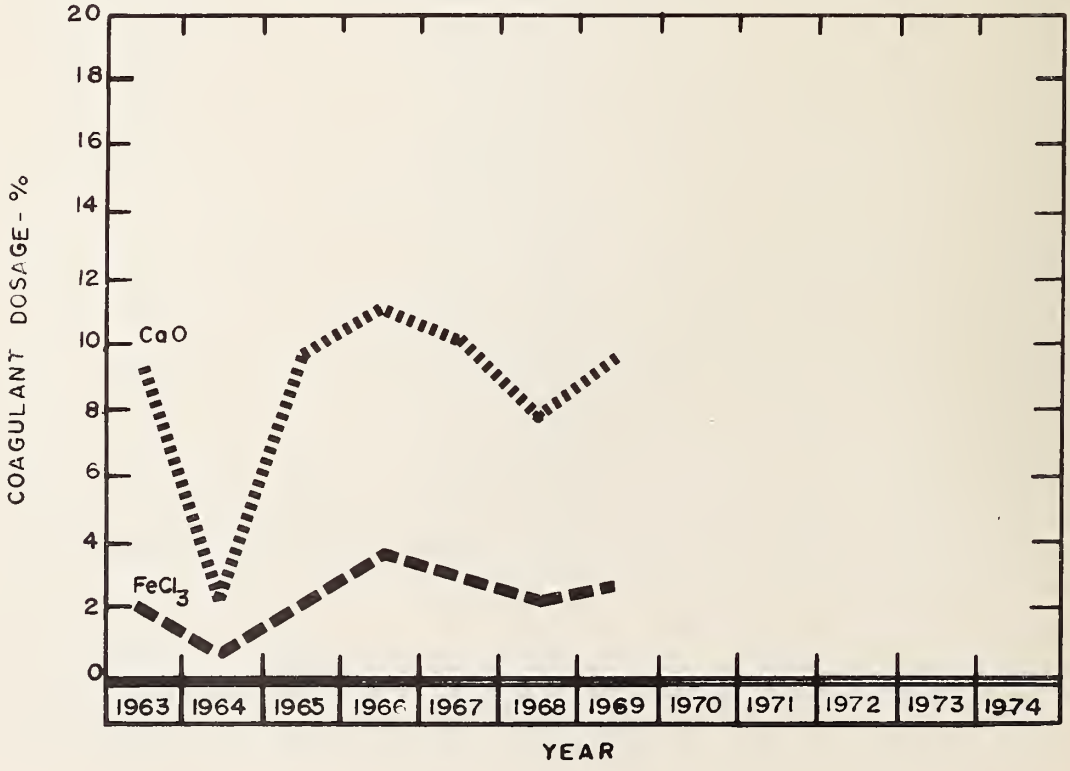
MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT REMOVAL
	INF.	EFF.	REDUCTION		INF. CONCN	EFF. CONCN	REDUCTION		
	mg/l	mg/l	%	10^5 pounds	mg/l	mg/l	%	10^5 pounds	cu ft
JAN	600	21	96	2.63	1275	30	98	5.65	58
FEB	350	12	96	1.44	910	18	98	3.80	64
MAR	585	9	98	2.28	1135	10	99	4.44	96
APR	850	14	98	3.31	1673	23	99	6.54	92
MAY	660	15	98	2.78	415	10	98	1.74	63
JUNE	725	36	95	2.26	1395	30	98	7.00	299
JULY	545	14	97	1.96	760	18	98	2.74	151
AUG	550	13	98	2.00	950	13	99	3.49	102
SEPT	710	4	99	2.60	1630	13	99	5.95	144
OCT	440	3	99	1.91	560	20	96	2.36	113
NOV	290	12	96	1.16	810	10	99	3.33	122
DEC	865	15	98	3.37	1465	25	98	5.71	108
TOTAL	-	-	-	-	-	-	-	-	1412
AVERAGE	598	14	98	2.31	1082	18	98	4.40	118

AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF. BOD mg/l	AERATION INF. SS CONCN mg/l	SECONDY. EFF. BOD mg/l	SECONDY. EFF. SS CONCN mg/l	M L S S CONCN mg/l	F/M lb BOD / lb MLSS	AIR USED 1000 cu ft / lb BOD	WASTE SLUDGE 10^3 pounds
JAN	1.46	120	115	31	35	2050	.12	-	48.
FEB	1.52	140	145	13	15	2380	.13	-	60.
MAR	1.27	190	140	13	10	2390	.14	-	53.
APR	1.32	113	130	19	20	3020	.07	-	72.
MAY	1.39	280	160	9	10	3100	.18	-	72.
JUNE	1.10	300	150	48	43	2700	.17	-	56.
JULY	1.19	167	135	14	20	2060	.14	-	45.
AUG	1.20	247	122	28	10	1670	.25	-	37.
SEPT	1.23	235	150	10	15	1300	.31	-	28.
OCT	1.41	180	180	6	10	1490	.23	-	37.
NOV	1.39	194	140	12	13	1310	.29	-	34.
DEC	1.28	220	155	14	33	1440	.27	-	34.
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	1.30	199	144	18	20	2076	.19	-	48.



VACUUM FILTRATION



VACUUM FILTRATION

MONTH	TOTAL FILTER USE hr	SLUDGE		CONDITIONING CHEMICALS						FILTER CAKE % TS	FILTR. % TS	YIELD lb/hr / sq ft
		TOTAL SOLIDS %	DRY SOLIDS 10^3 lb	CaO		$FeCl_3$		POLYMER				
				USED 10^3 lb	DOSE %	USED 10^3 lb	DOSE %	USED lb	DOSE ppm			
JAN	65	9.9	136	10.0	7.3	3.0	2.2			23	0.8	9.1
FEB	78	9.6	163	12.6	7.7	3.8	2.3			24	0.7	9.2
MAR	82	10.2	175	15.6	8.9	4.4	2.5			24	0.9	9.8
APR	80	12.1	177	14.2	8.0	4.0	2.3			28	1.1	9.8
MAY	54	12.8	116	9.6	8.3	2.6	2.2			28	1.1	9.8
JUNE	90	8.2	174	19.4	11.2	5.6	3.2			23	1.3	8.5
JULY	91	6.3	166	20.0	12.0	5.9	3.6			22	1.1	8.0
AUG	60	6.4	106	10.5	9.9	3.5	3.3			23	1.1	7.5
SEPT	78	7.0	152	16.8	11.1	4.5	3.0			22	1.2	8.5
OCT	90	6.7	176	20.4	11.6	5.1	2.9			23	1.1	8.7
NOV	79	7.0	159	18.9	11.9	5.4	3.4			21	1.3	9.0
DEC	86	7.2	176	17.8	10.1	5.5	3.1			24	1.1	9.0
TOTAL	933	-	1876	185.8	-	53.3	-			-	-	-
AVERAGE	78	8.6	156	15.5	9.8	4.4	2.8			24	1.1	8.9

SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10^3 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10 gal	TOTAL SOLIDS %	DEWATERED cu yd	LIQUID cu yd
JAN	252	8.0	86	-	-	-	-	-	384	637
FEB	187	9.6	86	-	-	-	-	-	456	182
MAR	218	10.1	86	-	-	-	-	-	480	0
APR	148	11.9	85	-	-	-	-	-	480	0
MAY	181	12.2	-	-	-	-	-	-	312	650
JUNE	350	8.5	-	-	-	-	-	-	456	1001
JULY	308	6.3	-	-	-	-	-	-	384	296
AUG	228	6.3	-	-	-	-	-	-	288	539
SEPT	292	7.0	-	-	-	-	-	-	456	301
OCT	349	6.7	-	-	-	-	-	-	504	623
NOV	332	7.3	-	-	-	-	-	-	456	812
DEC	366	7.3	-	-	-	-	-	-	504	756
TOTAL	3211	-	-	-	-	-	-	-	5160	5797
AVERAGE	268	8.4	86	-	-	-	-	-	430	580

Date Due

Water management in Ontario